

Claims

1 1. (Previously Presented) A method for recovering from a failure in a
2 network, comprising:
3 sending a first set of information from a source to a destination via a first route;
4 detecting a failure along said first route;
5 in response to said failure, directing a message to said source informing said
6 source of said failure; and
7 in response to said message, sending a future set of information from said source
8 to said destination via an alternate route;
9 wherein directing said message to said source comprises:
10 identifying said source;
11 accessing a routing table which comprises one or more routes to said
12 source;
13 obtaining a return route from said routing table; and
14 sending said message to said source via said return route.

1 2. (Original) The method of claim 1, further comprising:
2 in response to said message, preventing other sets of information from being sent
3 from said source to said destination via said first route.

1 3. (Original) The method of claim 1, where said first set of information
2 comprises a data portion, and wherein said method further comprises:

3 in response to said message, resending at least said data portion of said first set of
4 information from said source to said destination via said alternate route.

1 4. (Original) The method of claim 3, wherein said message comprises said
2 data portion such that said data portion is returned to said source.

1 5-6 Canceled

1 7. (Previously Presented) The method of claim 1, wherein identifying said
2 source comprises:
3 extracting from said first set of information an identifier which identifies said
4 source.

1 8. Canceled

1 9. (Original) The method of claim 1, wherein said method is implemented
2 on a routing layer of said network.

1 10. (Original) The method of claim 1, wherein said method is implemented
2 within a router of said network.

1 11. (Previously Presented) A method, implemented within a router of a
2 network, for recovering from a failure, comprising:

3 sending a first set of information from an ingress module to an egress module via
4 a first route;
5 detecting a failure in said first route;
6 in response to said failure, directing a message to said ingress module informing
7 said ingress module of said failure; and
8 in response to said message, sending a future set of information from said ingress
9 module to said egress module via an alternate route;
10 wherein directing said message to said ingress module comprises:
11 identifying said ingress module;
12 accessing a routing table which comprises one or more routes to said
13 ingress module;
14 obtaining a return route from said routing table; and
15 sending said message to said ingress module via said return route.

1 12. (Previously Presented) The method of claim 11, wherein said first route
2 and said alternate route are predetermined and stored within a second routing table.

1 13. (Previously Presented) The method of claim 12, wherein sending said
2 future set of information comprises:
3 selecting said alternate route from said second routing table.

1 14. (Original) The method of claim 11, further comprising:

2 in response to said message, preventing other sets of information from being sent
3 from said ingress module to said egress module via said first route.

1 15. (Previously Presented) The method of claim 14, wherein said first route
2 and said alternate route are predetermined and stored within a second routing table, and
3 wherein preventing comprises:
4 replacing said first route with said alternate route in said second routing table.

1 16. (Previously Presented) The method of claim 11, wherein said first set of
2 information comprises a data portion, and wherein said method further comprises:
3 in response to said message, resending at least said data portion of said first set of
4 information from said ingress module to said egress module via said alternate route for
5 forwarding to a destination.

1 17. (Original) The method of claim 16, wherein said message comprises said
2 data portion such that said data portion is returned to said ingress module.

1 18. Canceled

1 19. (Previously Presented) The method of claim 11, wherein identifying said
2 ingress module comprises:
3 extracting from said first set of information an identifier which identifies said
4 ingress module.

1 20. (Original) The method of claim 11, wherein said ingress module
2 comprises an ingress line card, and said egress module comprises an egress line card.

1 21. (Previously Presented) A method, implemented within a router of a
2 network, for recovering from a failure, comprising:
3 sending a first set of information from an ingress module to a first egress module
4 for forwarding by said first egress module to a destination external to said router;
5 detecting a failure of said first egress module;
6 in response to said failure of said first egress module, directing a message to said
7 ingress module informing said ingress module of said first egress module failure;
8 in response to said message, selecting an alternate egress module capable of
9 forwarding information to said destination; and
10 sending a future set of information from said ingress module to said alternate
11 egress module for forwarding to said destination;
12 wherein directing said message to said ingress module comprises:
13 identifying said ingress module;
14 accessing a routing table which comprises one or more routes to said
15 ingress module;
16 obtaining a return route from said routing table; and
17 sending said message to said ingress module via said return route.

1 22. (Original) The method of claim 21, wherein said first set of information
2 and said future set of information are both part of a flow, and wherein said method
3 further comprises:
4 in response to said message, preventing other sets of information associated with
5 said flow from being sent from said ingress module to said first egress module.

1 23. (Original) The method of claim 22, wherein said first egress module and
2 said alternate egress module are predetermined, wherein identifiers associated with said
3 first egress module and said alternate egress module are stored within a flow block
4 associated with said flow, and wherein preventing comprises:
5 storing an indication in said flow block that all sets of information associated with
6 said flow are not to be sent to said first egress module.

1 24. (Previously Presented) The method of claim 21, wherein said first set of
2 information and said future set of information are both part of a flow, and wherein said
3 method further comprises:
4 in response to said message, causing other sets of information associated with said
5 flow to be sent from said ingress module to said alternate egress module.

1 25. (Original) The method of claim 24, wherein said first egress module and
2 said alternate egress module are predetermined, wherein identifiers associated with said
3 first egress module and said alternate egress module are stored within a flow block
4 associated with said flow, and wherein causing comprises:

5 storing an indication in said flow block that all sets of information associated with
6 said flow are to be sent to said alternate egress module.

1 26. (Original) The method of claim 21, wherein said first set of information
2 and said future set of information are both part of a flow, wherein said first egress module
3 and said alternate egress module are predetermined, wherein identifiers associated with
4 said first egress module and said alternate egress module are stored within a flow block
5 associated with said flow, and wherein selecting said alternate egress module comprises:
6 accessing said flow block to access the identifier associated with said alternate
7 egress module.

1 27. (Original) The method of claim 21, wherein said first set of information
2 comprises a data portion, and wherein said method further comprises:
3 in response to said message, resending at least said data portion of said first set of
4 information from said ingress module to said alternate egress module for forwarding to
5 said destination.

1 28. (Original) The method of claim 27, wherein said message comprises said
2 data portion such that said data portion is returned to said ingress module.

1 29. Canceled

1 30. (Previously Presented) The method of claim 21, wherein identifying said
2 ingress module comprises:
3 extracting from said first set of information an identifier which identifies said
4 ingress module.

1 31. (Original) The method of claim 21, wherein said ingress module
2 comprises an ingress line card, said first egress module comprises a first egress line card,
3 and said alternate egress module comprises a second egress line card.

1 32. (Original) The method of claim 21, wherein said method is implemented
2 on a routing layer of said network.

1 33. (Previously Presented) A method, implemented within a router of a
2 network, for recovering from a failure, comprising:
3 sending a first set of information from an ingress module to a first egress module
4 for forwarding by said first egress module to a destination external to said router;
5 detecting an external failure beyond said first egress module;
6 in response to said external failure, directing a message to said ingress module
7 informing said ingress module of said external failure;
8 in response to said message, selecting an alternate egress module capable of
9 forwarding information to said destination; and
10 sending a future set of information from said ingress module to said alternate
11 egress module for forwarding to said destination;

12 wherein directing said message to said ingress module comprises:
13 identifying said ingress module;
14 accessing a routing table which comprises one or more routes to said
15 ingress module;
16 obtaining a return route from said routing table; and
17 sending said message to said ingress module via said return route.

1 34. (Original) The method of claim 33, wherein said first set of information
2 and said future set of information are both part of a flow, and wherein said method
3 further comprises:
4 in response to said message, preventing other sets of information associated with
5 said flow from being sent from said ingress module to said first egress module.

1 35. (Original) The method of claim 34, wherein said first egress module and
2 said alternate egress module are predetermined, wherein identifiers associated with said
3 first egress module and said alternate egress module are stored within a flow block
4 associated with said flow, and wherein preventing comprises:
5 storing an indication in said flow block that all sets of information associated with
6 said flow are not to be sent to said first egress module.

1 36. (Previously Presented) The method of claim 33, wherein said first set of
2 information and said future set of information are both part of a flow, and wherein said
3 method further comprises:

4 in response to said message, causing other sets of information associated with said
5 flow to be sent from said ingress module to said alternate egress module.

1 37. (Original) The method of claim 36, wherein said first egress module and
2 said alternate egress module are predetermined, wherein identifiers associated with said
3 first egress module and said alternate egress module are stored within a flow block
4 associated with said flow, and wherein causing comprises:
5 storing an indication in said flow block that all sets of information associated with
6 said flow are to be sent to said alternate egress module.

1 38. (Original) The method of claim 33, wherein said first set of information
2 and said future set of information are both part of a flow, wherein said first egress module
3 and said alternate egress module are predetermined, wherein identifiers associated with
4 said first egress module and said alternate egress module are stored within a flow block
5 associated with said flow, and wherein selecting said alternate egress module comprises:
6 accessing said flow block to access the identifier associated with said alternate
7 egress module.

1 39. (Original) The method of claim 33, wherein said first set of information
2 comprises a data portion, and wherein said method further comprises:
3 in response to said message, resending at least said data portion of said first set of
4 information from said ingress module to said alternate egress module for forwarding to
5 said destination.

1 40. (Original) The method of claim 39, wherein said message comprises said
2 data portion such that said data portion is returned to said ingress module.

1 41. Canceled

1 42. (Previously Presented) The method of claim 33, wherein identifying said
2 ingress module comprises:
3 extracting from said first set of information an identifier which identifies said
4 ingress module.

1 43. (Original) The method of claim 33, wherein said ingress module
2 comprises an ingress line card, said first egress module comprises a first egress line card,
3 and said alternate egress module comprises a second egress line card.

1 44. (Original) The method of claim 33, wherein said method is implemented
2 on a routing layer of said network.

1 45. (Original) The method of claim 33, wherein said external failure
2 precludes said first egress module from forwarding said first set of information to said
3 destination.

1 46. (Previously Presented) A router, comprising:

2 an ingress module;
3 an egress module; and
4 a forwarding mechanism for forwarding information between said ingress module
5 and said egress module;

6 wherein said ingress module sends a first set of information to said forwarding
7 mechanism to be forwarded to said egress module via a first route, said forwarding
8 mechanism detecting a failure in said first route, and in response to said failure, said
9 forwarding mechanism directing a message to said ingress module informing said ingress
10 module of said failure, and in response to said message, said ingress module sending a
11 future set of information to said forwarding mechanism to be forwarded to said egress
12 module via an alternate route;

13 wherein said forwarding mechanism directs said message to said ingress module
14 by:

15 identifying said ingress module;
16 accessing a routing table which comprises one or more routes to said
17 ingress module;
18 obtaining a return route from said routing table; and
19 sending said message to said ingress module via said return route.

1 47. (Previously Presented) The router of claim 46, wherein said ingress
2 module comprises a memory, and wherein said first route and said alternate route are
3 predetermined and stored within a second routing table in said memory.

1 48. (Previously Presented) The router of claim 47, wherein said ingress
2 module selects said alternate route from said second routing table.

1 49. (Original) The router of claim 46, wherein said ingress module, in
2 response to said message, prevents other sets of information from being sent from said
3 ingress module to said egress module via said first route.

1 50. (Previously Presented) The router of claim 49, wherein said ingress
2 module comprises a memory, wherein said first route and said alternate route are
3 predetermined and stored within a second routing table in said memory, and wherein said
4 ingress module prevents other sets of information from being sent from said ingress
5 module to said egress module via said first route by replacing said first route with said
6 alternate route in said second routing table.

1 51. (Original) The router of claim 46, wherein said first set of information
2 comprises a data portion, and wherein said ingress module, in response to said message,
3 resends at least said data portion of said first set of information to said forwarding
4 mechanism to be forwarded to said egress module via said alternate route.

1 52. (Original) The router of claim 51, wherein said forwarding mechanism
2 includes said data portion in said message such that said data portion is returned by said
3 forwarding mechanism to said ingress module.

1 53. Canceled

1 54. (Previously Presented) The router of claim 46, wherein said forwarding
2 mechanism identifies said ingress module by extracting from said first set of information
3 an identifier which identifies said ingress module.

1 55. (Original) The router of claim 46, wherein said ingress module comprises
2 an ingress line card, said egress module comprises an egress line card, and said
3 forwarding mechanism comprises a switching fabric.

1 56. (Original) The router of claim 55, wherein said switching fabric
2 comprises a fabric card.

1 57. (Previously Presented) A router, comprising:
2 an ingress module;
3 a first egress module;
4 an alternate egress module; and
5 a forwarding mechanism for forwarding information between said ingress
6 module, said first egress module, and said alternate egress module;
7 wherein said ingress module sends a first set of information to said forwarding
8 mechanism to be forwarded to said first egress module, said first set of information
9 intended to be forwarded by said first egress module to a destination external to said
10 router, said forwarding mechanism detecting a failure which precludes forwarding of said

11 first set of information to said first egress module, and in response to said failure, said
 12 forwarding mechanism directing a message to said ingress module informing said ingress
 13 module of said failure, and based upon said message, said ingress module determining
 14 that said first egress module has failed, and in response to said message, said ingress
 15 module selecting said alternate egress module and sending a future set of information to
 16 said forwarding mechanism to be forwarded to said alternate egress module, said future
 17 set of information intended to be forwarded by said alternate egress module to said
 18 destination;

19 wherein said forwarding mechanism directs said message to said ingress module
 20 by:

21 identifying said ingress module;
 22 accessing a routing table which comprises one or more routes to said
 23 ingress module;
 24 obtaining a return route from said routing table; and
 25 sending said message to said ingress module via said return route.

1 58. (Original) The router of claim 57, wherein said first set of information
 2 and said future set of information are both part of a flow, and wherein said ingress
 3 module, in response to said message, prevents other sets of information associated with
 4 said flow from being sent from said ingress module to said first egress module.

1 59. (Original) The router of claim 58, wherein said first egress module and
 2 said alternate egress module are predetermined, wherein said ingress module comprises a

3 memory, wherein identifiers associated with said first egress module and said alternate
4 egress module are stored within a flow block associated with said flow, said flow block
5 being stored in said memory, and wherein said ingress module prevents other sets of
6 information associated with said flow from being sent from said ingress module to said
7 first egress module by storing an indication in said flow block that all sets of information
8 associated with said flow are not to be sent to said first egress module.

1 60. (Previously Presented) The router of claim 57, wherein said first set of
2 information and said future set of information are both part of a flow, and wherein said
3 ingress module, in response to said message, causes other sets of information associated
4 with said flow to be sent from said ingress module to said alternate egress module via
5 said forwarding mechanism.

1 61. (Previously Presented) The router of claim 60, wherein said first egress
2 module and said alternate egress module are predetermined, wherein said ingress module
3 comprises a memory, wherein identifiers associated with said first egress module and
4 said alternate egress module are stored within a flow block associated with said flow, said
5 flow block being stored in said memory, and wherein said ingress module causes other
6 sets of information associated with said flow to be sent from said ingress module to said
7 alternate egress module by storing an indication in said flow block that all sets of
8 information associated with said flow are to be sent to said alternate egress module.

1 62. (Original) The router of claim 57, wherein said first set of information
2 and said future set of information are both part of a flow, wherein said first egress module
3 and said alternate egress module are predetermined, wherein said ingress module
4 comprises a memory, wherein identifiers associated with said first egress module and
5 said alternate egress module are stored within a flow block associated with said flow, said
6 flow block being stored in said memory, and wherein said ingress module selects said
7 alternate egress module by accessing said flow block to access the identifier associated
8 with said alternate egress module.

1 63. (Original) The router of claim 57, wherein said first set of information
2 comprises a data portion, and wherein said ingress module, in response to said message,
3 resends at least said data portion of said first set of information to said forwarding
4 mechanism to be forwarded to said alternate egress module for forwarding to said
5 destination.

1 64. (Original) The router of claim 63, wherein said forwarding mechanism
2 includes said data portion in said message such that said data portion is returned by said
3 forwarding mechanism to said ingress module.

1 65. Canceled

1 66. (Previously Presented) The router of claim 57, wherein said forwarding
2 mechanism identifies said ingress module by extracting from said first set of information
3 an identifier which identifies said ingress module.

1 67. (Original) The router of claim 57, wherein said ingress module comprises
2 an ingress line card, said first egress module comprises a first egress line card, said
3 alternate egress module comprises a second egress line card, and said forwarding
4 mechanism comprises a switching fabric.

1 68. (Original) The router of claim 67, wherein said switching fabric
2 comprises a fabric card.

1 69. (Previously Presented) A router, comprising:
2 an ingress module;
3 a first egress module;
4 an alternate egress module; and
5 a forwarding mechanism for forwarding information between said ingress
6 module, said first egress module, and said alternate egress module;
7 wherein said ingress module sends a first set of information to said forwarding
8 mechanism to be forwarded to said first egress module, said first set of information
9 intended to be forwarded by said first egress module to a destination external to said
10 router, said first egress module detecting an external failure which precludes said first
11 egress module from forwarding said first set of information to said destination, and in

12 response to said external failure, said first egress module directing a message to said
13 ingress module informing said ingress module of said external failure, and in response to
14 said message, said ingress module selecting said alternate egress module and sending a
15 future set of information to said forwarding mechanism to be forwarded to said alternate
16 egress module, said future set of information intended to be forwarded by said alternate
17 egress module to said destination;

18 wherein said first egress module directs said message to said ingress module by:

19 identifying said ingress module;

20 accessing a routing table which comprises one or more routes to said

21 ingress module;

22 obtaining a return route from said routing table; and

23 sending said message to said ingress module via said return route.

1 70. (Original) The router of claim 69, wherein said first set of information
2 and said future set of information are both part of a flow, and wherein said ingress
3 module, in response to said message, prevents other sets of information associated with
4 said flow from being sent from said ingress module to said first egress module.

1 71. (Original) The router of claim 70, wherein said first egress module and
2 said alternate egress module are predetermined, wherein said ingress module comprises a
3 memory, wherein identifiers associated with said first egress module and said alternate
4 egress module are stored within a flow block associated with said flow, said flow block
5 being stored in said memory, and wherein said ingress module prevents other sets of

6 information associated with said flow from being sent from said ingress module to said
7 first egress module by storing an indication in said flow block that all sets of information
8 associated with said flow are not to be sent to said first egress module.

1 72. (Previously Presented) The router of claim 69, wherein said first set of
2 information and said future set of information are both part of a flow, and wherein said
3 ingress module, in response to said message, causes other sets of information associated
4 with said flow to be sent from said ingress module to said alternate egress module via
5 said forwarding mechanism.

1 73. (Previously Presented) The router of claim 72, wherein said first egress
2 module and said alternate egress module are predetermined, wherein said ingress module
3 comprises a memory, wherein identifiers associated with said first egress module and
4 said alternate egress module are stored within a flow block associated with said flow, said
5 flow block being stored in said memory, and wherein said ingress module causes other
6 sets of information associated with said flow to be sent from said ingress module to said
7 alternate egress module by storing an indication in said flow block that all sets of
8 information associated with said flow are to be sent to said alternate egress module.

1 74. (Original) The router of claim 69, wherein said first set of information
2 and said future set of information are both part of a flow, wherein said first egress module
3 and said alternate egress module are predetermined, wherein said ingress module
4 comprises a memory, wherein identifiers associated with said first egress module and

5 said alternate egress module are stored within a flow block associated with said flow, said
6 flow block being stored in said memory, and wherein said ingress module selects said
7 alternate egress module by accessing said flow block to access the identifier associated
8 with said alternate egress module.

1 75. (Original) The router of claim 69, wherein said first set of information
2 comprises a data portion, and wherein said ingress module, in response to said message,
3 resends at least said data portion of said first set of information to said forwarding
4 mechanism to be forwarded to said alternate egress module for forwarding to said
5 destination.

1 76. (Original) The router of claim 75, wherein said first egress module
2 includes said data portion in said message such that said data portion is returned by said
3 first egress module to said ingress module.

1 77. Canceled

1 78. (Previously Presented) The router of claim 69, wherein said first egress
2 module identifies said ingress module by extracting from said first set of information an
3 identifier which identifies said ingress module.

1 79. (Original) The router of claim 69, wherein said ingress module comprises
2 an ingress line card, said first egress module comprises a first egress line card, said

3 alternate egress module comprises a second egress line card, and said forwarding
4 mechanism comprises a switching fabric.

1 80. (Original) The router of claim 79, wherein said switching fabric
2 comprises a fabric card.

1 81. (Previously Presented) A method implemented by a forwarding
2 mechanism in a router, comprising:
3 receiving a set of information sent by an ingress module intended to be forwarded
4 to an egress module via a particular route;
5 detecting a failure in said particular route; and
6 in response to said failure, directing a message to said ingress module informing
7 said ingress module of said failure;
8 wherein directing said message to said ingress module comprises:
9 identifying said ingress module;
10 accessing a routing table which comprises one or more routes to said
11 ingress module;
12 obtaining a return route from said routing table; and
13 sending said message to said ingress module via said return route.

1 82. (Original) The method of claim 81, wherein said set of information
2 comprises a data portion, and wherein directing said message to said ingress module
3 comprises:

4 returning said data portion to said ingress module.

1 83. (Original) The method of claim 81, wherein said set of information
2 comprises a data portion, and wherein directing said message to said ingress module
3 comprises:

4 including said data portion in said message such that said data portion is returned
5 to said ingress module.

1 84. Canceled

1 85. (Previously Presented) The method of claim 81, wherein identifying said
2 ingress module comprises:
3 extracting from said first set of information an identifier which identifies said
4 ingress module.

1 86. Canceled

1 87. (Previously Presented) A forwarding mechanism in a router, comprising:
2 a mechanism for receiving a set of information sent by an ingress module
3 intended to be forwarded to an egress module via a particular route;
4 a mechanism for detecting a failure in said particular route; and
5 a mechanism for directing, in response to said failure, a message to said ingress
6 module informing said ingress module of said failure;

7 wherein said forwarding mechanism further comprises a memory for storing a
8 routing table which comprises one or more routes to said ingress module, and wherein the
9 mechanism for directing said message to said ingress module comprises:

10 a mechanism for identifying said ingress module;

11 a mechanism for accessing said routing table;

12 a mechanism for obtaining a return route from said routing table; and

13 a mechanism for sending said message to said ingress module via said
14 return route.

1 88. (Original) The forwarding mechanism of claim 87, wherein said set of
2 information comprises a data portion, and wherein the mechanism for directing said
3 message to said ingress module comprises:

4 a mechanism for returning said data portion to said ingress module.

1 89. (Original) The forwarding mechanism of claim 87, wherein said set of
2 information comprises a data portion, and wherein the mechanism for directing said
3 message to said ingress module comprises:

4 a mechanism for including said data portion in said message such that said data
5 portion is returned to said ingress module.

1 90. Canceled

1 91. (Previously Presented) The forwarding mechanism of claim 87, wherein
2 the mechanism for identifying said ingress module comprises:
3 a mechanism for extracting from said first set of information an identifier which
4 identifies said ingress module.

1 92. Canceled

1 93. (Previously Presented) A method implemented by an egress module in a
2 router, comprising:
3 receiving a set of information sent by an ingress module intended to be forwarded
4 by the egress module to a destination external to the router;
5 detecting a failure external to the router which precludes the egress module from
6 forwarding said set of information to said destination; and
7 in response to said failure, directing a message to said ingress module informing
8 said ingress module of said failure;
9 wherein directing said message to said ingress module comprises:
10 identifying said ingress module;
11 accessing a routing table which comprises one or more routes to said
12 ingress module;
13 obtaining a return route from said routing table; and
14 sending said message to said ingress module via said return route.

15

1 94. (Original) The method of claim 93, wherein said set of information
2 comprises a data portion, and wherein directing said message to said ingress module
3 comprises:
4 returning said data portion to said ingress module.

1 95. (Original) The method of claim 93, wherein said set of information
2 comprises a data portion, and wherein directing said message to said ingress module
3 comprises:
4 including said data portion in said message such that said data portion is returned
5 to said ingress module.

1 96. Canceled

1 97. (Previously Presented) The method of claim 93, wherein identifying said
2 ingress module comprises:
3 extracting from said first set of information an identifier which identifies said
4 ingress module.

1 98. Canceled

1 99. (Previously Presented) An egress module in a router, comprising:
2 a mechanism for receiving a set of information sent by an ingress module
3 intended to be forwarded by said egress module to a destination external to the router;

4 a mechanism for detecting a failure external to the router which precludes said
 5 egress module from forwarding said set of information to said destination; and
 6 a mechanism for directing, in response to said failure, a message to said ingress
 7 module informing said ingress module of said failure;
 8 wherein said egress module further comprises a memory for storing a routing
 9 table which comprises one or more routes to said ingress module, and wherein the
 10 mechanism for directing said message to said ingress module comprises:
 11 a mechanism for identifying said ingress module;
 12 a mechanism for accessing said routing table;
 13 a mechanism for obtaining a return route from said routing table; and
 14 a mechanism for sending said message to said ingress module via said
 15 return route.

1 100. (Original) The egress module of claim 99, wherein said set of information
 2 comprises a data portion, and wherein the mechanism for directing said message to said
 3 ingress module comprises:
 4 a mechanism for returning said data portion to said ingress module.

1 101. (Original) The egress module of claim 99, wherein said set of information
 2 comprises a data portion, and wherein the mechanism for directing said message to said
 3 ingress module comprises:
 4 a mechanism for including said data portion in said message such that said data
 5 portion is returned to said ingress module.

1 102. Canceled

1 103. (Previously Presented) The egress module of claim 99, wherein the
2 mechanism for identifying said ingress module comprises:

3 a mechanism for extracting from said first set of information an identifier which
4 identifies said ingress module.

1 104-136. Canceled

1 137. (Previously Presented) A method, implemented within a router of a
2 network, for recovering from a failure, comprising:

3 sending a first set of information from an ingress module to a first egress module
4 for forwarding by said first egress module to a destination external to said router;

5 detecting a failure of said first egress module;

6 in response to said failure of said first egress module, directing a message to said
7 ingress module informing said ingress module of said first egress module failure;

8 in response to said message, selecting an alternate egress module capable of
9 forwarding information to said destination; and

10 sending a future set of information from said ingress module to said alternate
11 egress module for forwarding to said destination;

12 wherein said first set of information and said future set of information are both
13 part of a flow, wherein said first egress module and said alternate egress module are

14 predetermined, wherein identifiers associated with said first egress module and said
15 alternate egress module are stored within a flow block associated with said flow, and
16 wherein selecting said alternate egress module comprises:
17 accessing said flow block to access the identifier associated with said alternate
18 egress module.

1 138. (Previously Presented) The method of claim 137, further comprising:
2 in response to said message, preventing other sets of information associated with
3 said flow from being sent from said ingress module to said first egress module by storing
4 an indication in said flow block that all sets of information associated with said flow are
5 not to be sent to said first egress module.

1 139. (Previously Presented) The method of claim 137, further comprising:
2 in response to said message, causing other sets of information associated with said
3 flow to be sent from said ingress module to said alternate egress module by storing an
4 indication in said flow block that all sets of information associated with said flow are to
5 be sent to said alternate egress module.

1 140. (Previously Presented) A method, implemented within a router of a
2 network, for recovering from a failure, comprising:
3 sending a first set of information from an ingress module to a first egress module
4 for forwarding by said first egress module to a destination external to said router;
5 detecting an external failure beyond said first egress module;

6 in response to said external failure, directing a message to said ingress module
7 informing said ingress module of said external failure;

8 in response to said message, selecting an alternate egress module capable of
9 forwarding information to said destination; and

10 sending a future set of information from said ingress module to said alternate
11 egress module for forwarding to said destination;

12 wherein said first set of information and said future set of information are both
13 part of a flow, wherein said first egress module and said alternate egress module are
14 predetermined, wherein identifiers associated with said first egress module and said
15 alternate egress module are stored within a flow block associated with said flow, and
16 wherein selecting said alternate egress module comprises:

17 accessing said flow block to access the identifier associated with said alternate
18 egress module.

1 141. (Previously Presented) The method of claim 140, further comprising:

2 in response to said message, preventing other sets of information associated with
3 said flow from being sent from said ingress module to said first egress module by storing
4 an indication in said flow block that all sets of information associated with said flow are
5 not to be sent to said first egress module.

1 142. (Previously Presented) The method of claim 140, further comprising:

2 in response to said message, causing other sets of information associated with said
3 flow to be sent from said ingress module to said alternate egress module by storing an

4 indication in said flow block that all sets of information associated with said flow are to
5 be sent to said alternate egress module.

1 143. (Previously Presented) A router, comprising:

2 an ingress module;

3 a first egress module;

4 an alternate egress module; and

5 a forwarding mechanism for forwarding information between said ingress

6 module, said first egress module, and said alternate egress module;

7 wherein said ingress module sends a first set of information to said forwarding

8 mechanism to be forwarded to said first egress module, said first set of information

9 intended to be forwarded by said first egress module to a destination external to said

10 router, said forwarding mechanism detecting a failure which precludes forwarding of said

11 first set of information to said first egress module, and in response to said failure, said

12 forwarding mechanism directing a message to said ingress module informing said ingress

13 module of said failure, and based upon said message, said ingress module determining

14 that said first egress module has failed, and in response to said message, said ingress

15 module selecting said alternate egress module and sending a future set of information to

16 said forwarding mechanism to be forwarded to said alternate egress module, said future

17 set of information intended to be forwarded by said alternate egress module to said

18 destination;

19 wherein said first set of information and said future set of information are both

20 part of a flow, wherein said first egress module and said alternate egress module are

21 predetermined, wherein said ingress module comprises a memory, wherein identifiers
22 associated with said first egress module and said alternate egress module are stored
23 within a flow block associated with said flow, said flow block being stored in said
24 memory, and wherein said ingress module selects said alternate egress module by
25 accessing said flow block to access the identifier associated with said alternate egress
26 module.

1 144. (Previously Presented) The router of claim 143, wherein said ingress
2 module, in response to said message, prevents other sets of information associated with
3 said flow from being sent from said ingress module to said first egress module by storing
4 an indication in said flow block that all sets of information associated with said flow are
5 not to be sent to said first egress module.

1 145. (Previously Presented) The router of claim 143, wherein said ingress
2 module, in response to said message, causes other sets of information associated with
3 said flow to be sent from said ingress module to said alternate egress module by storing
4 an indication in said flow block that all sets of information associated with said flow are
5 to be sent to said alternate egress module.

1 146. (Previously Presented) A router, comprising:
2 an ingress module;
3 a first egress module;
4 an alternate egress module; and

5 a forwarding mechanism for forwarding information between said ingress
6 module, said first egress module, and said alternate egress module;

7 wherein said ingress module sends a first set of information to said forwarding
8 mechanism to be forwarded to said first egress module, said first set of information
9 intended to be forwarded by said first egress module to a destination external to said
10 router, said first egress module detecting an external failure which precludes said first
11 egress module from forwarding said first set of information to said destination, and in
12 response to said external failure, said first egress module directing a message to said
13 ingress module informing said ingress module of said external failure, and in response to
14 said message, said ingress module selecting said alternate egress module and sending a
15 future set of information to said forwarding mechanism to be forwarded to said alternate
16 egress module, said future set of information intended to be forwarded by said alternate
17 egress module to said destination;

18 wherein said first set of information and said future set of information are both
19 part of a flow, wherein said first egress module and said alternate egress module are
20 predetermined, wherein said ingress module comprises a memory, wherein identifiers
21 associated with said first egress module and said alternate egress module are stored
22 within a flow block associated with said flow, said flow block being stored in said
23 memory, and wherein said ingress module selects said alternate egress module by
24 accessing said flow block to access the identifier associated with said alternate egress
25 module.

1 147. (Previously Presented) The router of claim 146, wherein said ingress
2 module, in response to said message, prevents other sets of information associated with
3 said flow from being sent from said ingress module to said first egress module by storing
4 an indication in said flow block that all sets of information associated with said flow are
5 not to be sent to said first egress module.

1 148. (Previously Presented) The router of claim 146, wherein said ingress
2 module, in response to said message, causes other sets of information associated with
3 said flow to be sent from said ingress module to said alternate egress module by storing
4 an indication in said flow block that all sets of information associated with said flow are
5 to be sent to said alternate egress module.

1 149. (Previously Presented) A method implemented by an ingress module in a
2 router, comprising:
3 sending a first set of information to a first egress module, said first set of
4 information intended to be forwarded by the first egress module to a destination external
5 to the router;
6 receiving a message indicating that said first set of information did not reach the
7 destination successfully;
8 determining based upon said message whether future sets of information should
9 be sent to the first egress module;

10 in response to a determination that future sets of information should not be sent to
11 the first egress module, selecting an alternate egress module capable of forwarding
12 information to the destination; and
13 sending a future set of information to the alternate egress module to be forwarded
14 by the alternate egress module to the destination;
15 wherein said first set of information and said future set of information are both
16 part of a flow, wherein said first egress module and said alternate egress module are
17 predetermined, wherein identifiers associated with said first egress module and said
18 alternate egress module are stored within a flow block associated with said flow, and
19 wherein selecting the alternate egress module comprises:
20 accessing said flow block to access the identifier associated with the alternate
21 egress module.

1 150. (Previously Presented) The method of claim 149, further comprising:
2 in response to a determination that future sets of information should not be sent to
3 the first egress module, preventing other sets of information associated with said flow
4 from being sent to the first egress module by storing an indication in said flow block that
5 all sets of information associated with said flow are not to be sent to the first egress
6 module.

1 151. (Previously Presented) The method of claim 149, further comprising:
2 in response to a determination that future sets of information should not be sent to
3 the first egress module, causing other sets of information associated with said flow to be

4 sent to the alternate egress module by storing an indication in said flow block that all sets
5 of information associated with said flow are to be sent to the alternate egress module.

1 152. (Previously Presented) An ingress module in a router, comprising:
2 a mechanism for sending a first set of information to a first egress module, said
3 first set of information intended to be forwarded by the first egress module to a
4 destination external to the router;
5 a mechanism for receiving a message indicating that said first set of information
6 did not reach the destination successfully;
7 a mechanism for determining based upon said message whether future sets of
8 information should be sent to the first egress module;
9 a mechanism for selecting, in response to a determination that future sets of
10 information should not be sent to the first egress module, an alternate egress module
11 capable of forwarding information to the destination; and
12 a mechanism for sending a future set of information to the alternate egress module
13 to be forwarded by the alternate egress module to the destination;
14 wherein said ingress module comprises a memory, wherein said first set of
15 information and said future set of information are both part of a flow, wherein the first
16 egress module and the alternate egress module are predetermined, wherein identifiers
17 associated with the first egress module and the alternate egress module are stored within a
18 flow block associated with said flow, said flow block being stored in said memory, and
19 wherein the mechanism for selecting the alternate egress module comprises:

20 a mechanism for accessing said flow block to access the identifier associated with
21 the alternate egress module.

1 153. (Previously Presented) The ingress module of claim 152, further
2 comprising:
3 a mechanism for preventing, in response to a determination that future sets of
4 information should not be sent to the first egress module, other sets of information
5 associated with said flow from being sent to the first egress module, the mechanism for
6 preventing comprising a mechanism for storing an indication in said flow block that all
7 sets of information associated with said flow are not to be sent to the first egress module.

1 154. (Previously Presented) The ingress module of claim 152, further
2 comprising:
3 a mechanism for causing, in response to a determination that future sets of
4 information should not be sent to the first egress module, other sets of information
5 associated with said flow to be sent to the alternate egress module, the mechanism for
6 causing comprising a mechanism for storing an indication in said flow block that all sets
7 of information associated with said flow are to be sent to the alternate egress module.

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1 155. (New) In a router comprising an ingress module, an egress module, and a
2 switching fabric internal to the router, a method implemented by the ingress module,
3 comprising:

4 sending a first set of information to the egress module via a first route through the
5 switching fabric, said first set of information intended to be forwarded by the egress
6 module to a destination external to the router;

7 receiving a message indicating a failure in said first route through the switching
8 fabric; and

9 in response to said message, sending a future set of information to the egress
10 module via an alternate route through the switching fabric.

11

1 156. (New) The method of claim 155, wherein said first route and said
2 alternate route are predetermined and stored within a routing table, and wherein sending
3 said future set of information to the egress module comprises:

4 selecting said alternate route from said routing table.

1 157. (New) The method of claim 155, further comprising:

2 preventing future sets of information from being sent to the egress module via
3 said first route.

1 158. (New) The method of claim 157, wherein said first route and said
2 alternate route are predetermined and stored within a routing table, and wherein
3 preventing comprises:

4 replacing said first route with said alternate route in said routing table.

1 159. (New) The method of claim 155, wherein said first set of information
2 comprises a data portion, and wherein said method further comprises:
3 resending at least said data portion of said first set of information to the egress
4 module via said alternate route.

1 160. (New) The method of claim 159, wherein said message indicating a
2 failure in said first route comprises said data portion of said first set of information.

1 161. (New) In a router comprising an ingress module, a first egress module,
2 and an alternate egress module, a method implemented by the ingress module,
3 comprising:
4 sending a first set of information to the first egress module, said first set of
5 information intended to be forwarded by the first egress module to a destination external
6 to the router;
7 receiving a message indicating that the first egress module failed;
8 in response to said message, selecting the alternate egress module, which is
9 capable of forwarding information to the destination; and
10 sending a future set of information to the alternate egress module to be forwarded
11 by the alternate egress module to the destination

1 162. (New) The method of claim 161, wherein said first set of information and
2 said future set of information are both part of a flow, and wherein said method further
3 comprises:

4 preventing other sets of information associated with said flow from being sent to
5 the first egress module.

1 163. (New) The method of claim 162, wherein the first egress module and the
2 alternate egress module are predetermined, wherein identifiers associated with the first
3 egress module and the alternate egress module are stored within a flow block associated
4 with said flow, and wherein preventing comprises:
5 storing an indication in said flow block that all sets of information associated with
6 said flow are not to be sent to the first egress module.

1 164. (New) The method of claim 161, wherein said first set of information and
2 said future set of information are both part of a flow, and wherein said method further
3 comprises:
4 causing other sets of information associated with said flow to be sent to the
5 alternate egress module.

1 165. (New) The method of claim 164, wherein the first egress module and the
2 alternate egress module are predetermined, wherein identifiers associated with the first
3 egress module and the alternate egress module are stored within a flow block associated
4 with said flow, and wherein causing comprises:
5 storing an indication in said flow block that all sets of information associated with
6 said flow are to be sent to the alternate egress module.

1 166. (New) The method of claim 161, wherein said first set of information and
2 said future set of information are both part of a flow, wherein the first egress module and
3 the alternate egress module are predetermined, wherein identifiers associated with the
4 first egress module and the alternate egress module are stored within a flow block
5 associated with said flow, and wherein selecting the alternate egress module comprises:
6 accessing said flow block to access the identifier associated with the alternate
7 egress module.

1 167. (New) The method of claim 161, wherein said first set of information
2 comprises a data portion, and wherein said method further comprises:
3 resending at least said data portion of said first set of information to the alternate
4 egress module to be forwarded by the alternate egress module to the destination.

1 168. (New) The method of claim 167, wherein said message indicating that the
2 first egress module failed comprises said data portion of said first set of information.

1 169. (New) In a router comprising an egress module and a switching fabric
2 internal to the router, an ingress module, comprising:
3 a mechanism for sending a first set of information to the egress module via a first
4 route through the switching fabric, said first set of information intended to be forwarded
5 by the egress module to a destination external to the router;
6 a mechanism for receiving a message indicating a failure in said first route
7 through the switching fabric; and

8 a mechanism for sending, in response to said message, a future set of information
9 to the egress module via an alternate route through the switching fabric.

1 170. (New) The ingress module of claim 169, wherein said first route and said
2 alternate route are predetermined and stored within a routing table, and wherein the
3 mechanism for sending said future set of information to the egress module comprises:
4 a mechanism for selecting said alternate route from said routing table.

1 171. (New) The ingress module of claim 169, further comprising:
2 a mechanism for preventing future sets of information from being sent to the
3 egress module via said first route.

1 172. (New) The ingress module of claim 171, wherein said first route and said
2 alternate route are predetermined and stored within a routing table, and wherein the
3 mechanism for preventing comprises:
4 a mechanism for replacing said first route with said alternate route in said routing
5 table.

1 173. (New) The ingress module of claim 169, wherein said first set of
2 information comprises a data portion, and wherein said ingress module further comprises:
3 a mechanism for resending at least said data portion of said first set of information
4 to the egress module via said alternate route.

1 174. (New) The ingress module of claim 173, wherein said message indicating
2 a failure in said first route comprises said data portion of said first set of information.

1 175. (New) In a router comprising a first egress module and an alternate egress
2 module, an ingress module, comprising:

3 a mechanism for sending a first set of information to the first egress module, said
4 first set of information intended to be forwarded by the first egress module to a
5 destination external to the router;

6 a mechanism for receiving a message indicating that the first egress module
7 failed;

8 a mechanism for selecting, in response to said message, the alternate egress
9 module, which is capable of forwarding information to the destination; and

10 a mechanism for sending a future set of information to the alternate egress module
11 to be forwarded by the alternate egress module to the destination

1 176. (New) The ingress module of claim 175, wherein said first set of
2 information and said future set of information are both part of a flow, and wherein said
3 ingress module further comprises:

4 a mechanism for preventing other sets of information associated with said flow
5 from being sent to the first egress module.

1 177. (New) The ingress module of claim 176, wherein the first egress module
2 and the alternate egress module are predetermined, wherein identifiers associated with the

3 first egress module and the alternate egress module are stored within a flow block
4 associated with said flow, and wherein the mechanism for preventing comprises:
5 a mechanism for storing an indication in said flow block that all sets of
6 information associated with said flow are not to be sent to the first egress module.

1 178. (New) The ingress module of claim 175, wherein said first set of
2 information and said future set of information are both part of a flow, and wherein said
3 ingress module further comprises:
4 a mechanism for causing other sets of information associated with said flow to be
5 sent to the alternate egress module.

1 179. (New) The ingress module of claim 178, wherein the first egress module
2 and the alternate egress module are predetermined, wherein identifiers associated with the
3 first egress module and the alternate egress module are stored within a flow block
4 associated with said flow, and wherein the mechanism for causing comprises:
5 a mechanism for storing an indication in said flow block that all sets of
6 information associated with said flow are to be sent to the alternate egress module.

1 180. (New) The ingress module of claim 175, wherein said first set of
2 information and said future set of information are both part of a flow, wherein the first
3 egress module and the alternate egress module are predetermined, wherein identifiers
4 associated with the first egress module and the alternate egress module are stored within a

5 flow block associated with said flow, and wherein the mechanism for selecting the
6 alternate egress module comprises:
7 a mechanism for accessing said flow block to access the identifier associated with
8 the alternate egress module.

1 181. (New) The ingress module of claim 175, wherein said first set of
2 information comprises a data portion, and wherein said ingress module further comprises:
3 a mechanism for resending at least said data portion of said first set of information
4 to the alternate egress module to be forwarded by the alternate egress module to the
5 destination.

1 182. (New) The ingress module of claim 181, wherein said message indicating
2 that the first egress module failed comprises said data portion of said first set of
3 information.